## REMARKS

Claims 1-16 are pending. Claims 1 and 9 are amended.

**Rejections Under 35 U.S.C. §102 and §103**

Claims 1-2 and 8-10 are rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Dubin et al. Claims 3-7 and 11-16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Dubin et al. Claims 1 and 9 have been amended to recite performing an electrodeposition process after determining the transition current density at a single level that is capable of filling the cavity with the conductive material and forming a substantially flat profile over an opening of the cavity. These amendments are fully supported by the specification, as originally filed, at, for example, paragraphs [0040]-[0053]. Claims 1 and 9 are amended to clarify the invention – that the electrodeposition process is performed after the transition current density is determined and that the transition current density is at a single level. No new matter is added by these amendments.

The Examiner contends that Dubin et al. teach applying an initial current density and a superfill current density, which is higher than the initial current density. The Examiner is equating the Dubin et al. "superfill current density" with the claimed first process current density or transition current density. As noted in the previously filed response, Dubin et al. do not teach a single current density (the claimed transition current density) at a single level that would form a substantially flat profile over the cavity. The Examiner contends that "[i]t would have been obvious, therefore, to one having ordinary skill in the art to expect the single superfill current density (figure 7, features 714) to completely fill the features having a size of 0.3-0.6 μm . . . to form a substantially flat profile over these features."

While Dubin et al. teach to perform a superfill operation to fill surface features, Dubin et al. do not teach to first ***determine*** a transition current density at a single level that is capable of filling a cavity with conductive material and forming a substantially flat profile over an opening of the cavity and to ***use*** the transition current density to fill the cavity and form a substantially flat profile over the opening of the cavity, as recited in Claims 1 and 9. Dubin et al. teach to perform a series of repeated superfill and reverse plating steps, where the superfill steps use increasingly greater current densities, "to provide the desired surface morphology for chemical

mechanical polishing (CMP)." Dubin et al., at col. 5, lines 35-38. Thus, there is no teaching or suggestion in Dubin et al. that a single superfill operation, by itself, reduces die non-uniformity, let alone effects a substantially flat profile over the cavity. Even the series of repeated superfill and reverse plating steps does not result in a substantially flat profile, as Dubin et al. teach to perform CMP after the superfill, reverse plating, and bulk fill steps. See id. Furthermore, "die non-uniformity" does not mean "substantially flat profile." The skilled artisan would understand that the "desired surface morphology" that Dubin et al. teach to achieve with the series of repeated superfill and reverse plating steps is a reduction of "die non-uniformity" or "hump step height" over features and that CMP is used to planarize the surface to achieve a substantially flat profile. Id., at col. 6, lines 47-49. Dubin et al. teach that the reduction of "die non-uniformity" or "hump step height" is desirable prior to CMP because the unevenness caused by the humps from conventional plating processes "leads to overpolishing in a subsequent chemical mechanical polishing operation." Id., at col. 3 lines 45-49. Thus, the Dubin et al. superfill step(s) merely reduce hump step height or die non-uniformity, and do not result in a substantially flat profile over the cavity. Dubin et al. teach that CMP is used to effect the substantially flat profile.

Furthermore, Dubin et al. already achieve a reduction in die non-uniformity (note that Applicants do not equate this reduction in die non-uniformity with a substantially flat profile over a cavity). Thus, without a problem to solve in Dubin et al., the skilled artisan would have no motivation for further optimization. Even if the skilled artisan had a motivation to modify Dubin et al. (which Applicants submit the skilled artisan did not), aside from Applicants' invention serving as a blueprint, there is no teaching or suggestion in Dubin et al. that, among the various process parameters to choose from (forward and reverse densities and durations), the skilled artisan would choose to modify the density of a single superfill operation in order to reduce die non-uniformity.

Thus, amended Claims 1 and 9 are patentable as they are not anticipated by nor obvious over Dubin et al. Claims 2-8 and 10-16, which depend form and include all of the limitations of amended Claim 1 or 9, are therefore also patentable over Dubin et al. Furthermore, each of the dependent claims recites further distinguishing features of particular utility.

**Conclusion**

Applicants respectfully submit that all of the pending claims are patentably distinguishable over the prior art of record, and that the cited references, either alone or in combination, do not teach or suggest Applicants' claimed invention.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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